PROPULSION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/421,791, filed October 29, 2002.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates to a jet propulsion system. More specifically, the invention relates to a jet propulsion system having a jet or nozzle modified to produce a jet exhaust formation having a 3D spiral formation by using a slit to produce spiral exhaust for improving performance and handling, as well as reducing drag (i.e., jet and rocket engines), thereby increasing speed. The slit preferably has a generally S-shaped configuration.

2. DESCRIPTION OF RELATED ART

Jet propulsion is well known in both the fields of aircraft and marine vehicles. The exhaust of these vehicles is produced by rotating power plants, such as compressors and turbines, producing thrust. The resulting exhaust leaves the nozzles of these

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vehicles in a generally cylindrical plume. None of the prior art, however, teaches the conversion of the exhaust from a cylindrical plume into a 3D spiral formed by a twisting ribbon. Conventional propulsion system and proposed modifications thereto are exemplified in the following publications.

U.S. Patent Publication No. 2002/0049010, published April 25, 2002, teaches a steerable watercraft including a jet propelled power plant. U.S. Patent No. 2,420,323, issued to Meyer et al. on May 13, 1947, teaches a steering system in which a jet propelled vehicle is steered in response to a set of flaps located on the nozzle exhaust. U.S. Patent No. 2,928,238, issued to Hawkings, Jr. on March 15, 1960, teaches a jet aircraft having a controllable deflector and orifice control.

U.S. Patent No. 3,087,303, issued to Heinze et al. on April 30, 1963, teaches a jet propelled aircraft with a jet deflecting means. U.S. Patent No. 3,285,262, issued to Ernst et al. on November 15, 1966, teaches an aerodynamic servo-valve for use in guidance and stabilization of rockets. U.S. Patent No. 3,350,886, issued to Feraud et al. on November 7, 1967, teaches a rocket having a stabilizing and guiding means.

U.S. Patent No. 3,581,995, issued to Fischer on June 1, 1971, teaches a device for modifying the hot exhaust gases emanated from a jet aircraft. U.S. Patent No. 3,610,556, issued to Charlton, Jr. on October 5, 1971, teaches a directional control mechanism for reaction propelled aircraft. U.S. Patent No. 3,635,404, issued to Hopkins et al. on January 18, 1972, teaches a pin stabilizing rocket nozzle.

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U.S. Patent No. 3,640,469, issued to Hayes et al. on February 8, 1972, teaches a modification of a jet nozzle in which the vector of the jet is deflected about a single axis. U.S. Patent No. 3,802,376, issued to Smith on April 9, 1974, teaches a jet-propelled boat steering system. U.S. Patent No. 4,034,696, issued to Kureth on July 12, 1977, teaches a boat stabilizer.

U.S. Patent No. 4,063,685, issued to Jacobs on December 20, 1977, teaches a rocket thrust stabilizer nozzle. U.S. Patent No. 4,432,736, issued to Parramore on February 21, 1984, teaches a water-jet steering mechanism. U.S. Patent No. 4,643,374, issued to Friederich on February 17, 1987, teaches a jet propulsion steering apparatus. U.S. Patent No. 5,170,964, issued to Enderle et al. on December 15, 1992, teaches a jet-propelled nozzle thrust control.

U.S. Patent No. 5,735,115, issued to Maghon on April 7, 1998, teaches a gas turbine combustor with means for removing swirl in order to avoid turbulence. U.S. Patent No. 6,159,059, issued to Bernier et al. on December 12, 2000, teaches a thrust-controlled system for watercraft. U.S. Patent No. 6,279,499, issued to Griffin, Sr. et al. on August 28, 2001, teaches a rotational get-drive bow thruster for a marine propulsion system.

U.S. Patent No. 6,299,494, issued to Bowers et al. on October 9, 2001, teaches an articulated nozzle assembly for water jet apparatus. U.S. Patent No. 6,332,816, issued to Tsuchiya et al. on December 25, 2001, teaches a jet-propelled boat including steering control. U.S. Patent No. 6,371,407, issued to Renshaw on April 16, 2002, teaches a mechanism for vectoring jet exhaust

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flow. U.S. Patent No. 6,382,559, issued to Sutterfield et al. on May 7, 2002, teaches a further jet thrust vectoring mechanism.

U.K. Patent Application No. 1,063,945, published on February 22, 1965, teaches a liquid jet reaction propulsion unit. U.K. Patent Application No. 2,060,078, published on April 29, 1981, teaches a flight stabilization system for rockets including spiral twist of the exhaust flow. However, the invention avoids use of an external structure to create the intended thrust flow, but rather uses modification of the internal surface of the rocket exhaust nozzle to resemble the spiral pattern obtained from a rifled gun barrel.

U.K. Patent No. 2,094,252, published on March 2, 1981, teaches a water-jet steering mechanism. German Patent No. 3,222,413, published on December 15, 1983, teaches a direction converter for an aircraft for controlling vertical and horizontal flight. As noted above, many patents have issued describing various jet propelled vehicles including various types of directional control systems. However, none teach the application of a slit-shaped exit to control the flow of a jet exhaust to resemble a 3D spiral. More specifically, the present invention requires the use of a slit to create a 3D spiral exhaust pattern in any jet-propelled vehicle, including jet aircraft and watercraft.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

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SUMMARY OF THE INVENTION

The present invention is a modification of the exhaust of an existing jet propelled vehicle to produce a 3 dimensional ribbon-like spiral formation. The modified 3D jet exhaust can be created either by applying an attachment to an existing structure, e.g., jet ski, or by producing a slit-like exit into the nozzle during initial production of the jet- or rocket-propelled vehicle. Furthermore, instead of the thrust being initiated in a round or cylindrical shape, the initial thrust is formed in a straight line type thrust that is then changed by the exit slit to produce 3D spiral thrust.

Accordingly, it is a principal object of the invention to provide an attachment device for modifying the exhaust from a jet nozzle into a 3D spiral formation.

It is another object of the invention to provide a jet-propelled vehicle incorporating the modifying device to produce a 3D spiral formation.

It is yet another object of the invention to provide a jet-propelled vehicle incorporating the modifying device in which the slit has a generally "elongated S"-shaped configuration.

It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

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These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A is an environmental, perspective view of a jet-propulsion system according to the present invention.

Fig. 1B is a cross-sectional view of the jet-propulsion system of Fig. 1A showing the flow through the exhaust line prior to the inventive slit.

Fig. 1C is a cross-sectional view of the slit of the jet-propulsion system of Fig. 1A.

Fig. 1D is a rear view of a preferred S-shaped configuration for the slit.

Fig. 1E is a rear view of an alternative 4-edged spiral configuration for the slit.

Fig. 2 is a perspective view of an alternative modification of the inventive jet-propulsion system.

Fig. 3 is a perspective view of a modification of a rocket propulsion system in accordance with the invention.

Fig. 4 is a perspective view of a propulsion system of a self-contained structure, i.e., a spherical self-propelled vehicle, according to the present invention.

Fig. 5 is a perspective view of a propulsion system according to the present invention in a submarine.

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Fig. 6 is a side view of a jet ski exhaust modified to perform as a rudder.

Fig. 7 is a rear view of the modification of Fig. 6.

Fig. 8 is a side view of the exhaust of a rocket showing the modified exhaust plume.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is directed to a propulsion system for a jet- or rocket-propelled vehicle, including aircraft and watercraft. In particular, the invention is directed to a modification in which the jet propulsion exhaust exiting the jet nozzle is oriented in a 3D spiral created by an elongated S-shaped opening. The present invention may be used with any type of propulsion exhaust and is not limited to gas or water exhaust.

Fig. 1A shows a propulsion system of the present invention including a jet engine having a jet nozzle 14 which includes an attachment 10 applied to the nozzle 14 having a slit 12 defined therein. The flow of the jet exhaust from a conventional jet engine is typically a cylindrically shaped plume or contrail that progressively expands. The exhaust plume 20 of the present invention, however, is intended to be particularly in a 3D spiral configuration, as shown in Fig. 1A. As shown in Figs. 1A, 1B and 1C, the exhaust nozzle 14 has been modified by the addition of an attachment 10 having a slit aperture 12 therein, thereby modifying

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the exhaust profile 22. This attachment would replace the typical bell-shaped cone at the end of rocket engines. At the aperture 12, the exhaust 22 exits the slit, forming the 3D spiral formation. The sides, 24 and 26, of the slit in the attachment 10 may or may not be contoured to ensure the 3D spiral exhaust profile.

In all cases, the slit is preferably in the general shape of a long "S" having opposed inwardly and outwardly opposing portions. This preferred configuration is shown as the generally S-shaped slit 104 in Fig. 1D. The mirror image of this geometric configuration is also contemplated. Furthermore, a modification in which the configuration resembles the superposition of one long S-shaped slits perpendicularly onto a second S-shaped slit as shown in Fig. 1E, resulting in a four-edged spiral, is also contemplated.

Fig. 2 shows a propulsion system of the present invention in which the jet exhaust 36 of an aircraft jet or a watercraft has an exhaust profile 34 is in the form of a 3D spiral. The exhaust in this case is produced by the nozzle 30 in the jet exhaust 36. The exhaust jet 34 passes through a nozzle opening 32, which may or may not be contoured to ensure the 3D spiral exhaust formation.

Fig. 3 shows a modification of a rocket exhaust 46 incorporating a propulsion system according to the present invention. In this case, the propulsion system includes an aperture 42 having the general cross-section shown in Fig. 1D, in the exit nozzle 40 that creates a 3D spiral formation 44 of the exhaust.

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Fig. 4 shows a self-propelled vehicle 52 in which the exhaust forms a 3D spiral 54 exiting the slit formation 56 from the vehicle. In this case, the slit is part of a controllable smaller sphere 50 that is controllable inside the spherical vehicle 52 using various devices known in the art. The smaller sphere is positioned inside the larger spherical vehicle and projects outward from the vehicle through opening 58. The smaller sphere 50 is rotatable 360°, thereby rotating the slit 360° about a horizontal axis. This imparts control to the flow of the exhaust. Also, the smaller sphere can be directed left or right with respect to the horizontal direction of the exhaust flow.

Fig. 5 shows a version of the invention used in a submarine vehicle 60. In this case, the jet exhausts 68 are modified to create a 3D spiral formation 62.

Fig. 6 is a side view of the rear of a jet ski showing the cylindrical exhaust nozzle 180 having the modification 190 attached to it. Fig. 7 is a rear view of the slit of Fig. 6. The slit 192 in this case is shown having the generally long S-shaped configuration. Also, in this modification, the slit extends below the horizontal plane containing the central longitudinal axis of the exhaust nozzle. In this configuration, the foramen structure from which the thrust exits can be extended downward to perform as a rudder.

Figs. 8 is a side view of a rocket nozzle 330 having the modified long S-shaped opening at 350, and the resulting 3D spiral plume 340. In this case, the drag resistance by the nozzle is reduced when compared with the original cylindrical nozzle by

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having the air flow 360 drawn into the space on either side of the 3D spiral exhaust 340 as shown. Speed will be increased as a result of reduced drag.

Although the invention has been discussed above to denote attachments to jet and rocket nozzles to impart the desired 3D spiral exhaust formations, the modification can equally well be incorporated into the original equipment structure of the vehicle nozzle to provide the desired 3D spiral exhaust formation. In some situations, the slit can be made flexible and form a closed slit that opens when the exhaust pressure becomes sufficient to open the slit.

One example that clarifies the principle of 3D spiral propulsion would be the male urine stream.

It is to be understood that the present invention is not limited to the sole embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

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